respects the same, he was evidently inclined to class the whole of these genera under one generic denomination, despite their marked and manifold external differences. In his Sil. Suppl. p. 95, he says: "It will remain a question for further consideration whether we are justified in retaining the three generic denominations of *Nucleospira, Retzia,* and *Meristina,* for shells possessing the same simple loop." It is therefore in agreement with the principles of classification adopted by Davidson that I now place the species which Sowerby named *læviuscula* under the genus *Bifida,* of which *Bifida lepida* is the type.

P.S.—Davidson's Sil. Suppl. was issued in two portions in the Annual volumes of the Palæontographical Society for 1882 and 1883. After writing the above article I have found in the Index accompanying the latter portion of the Suppl. that Davidson ultimately had the same doubts as myself as to the true generic position of *læviuscula.* In the Index referred to—Sil. Suppl. p. 233—Davidson puts a note of interrogation to the generic name of *Athyris* as applied to *læviuscula,* and he adds concerning *Athyris,*—"It is not certain whether we possess any true British Silurian species of the genus."

NOTICES OF MEMOIRS.

Abstracts of Papers read before Section C. at British Association Meeting, Cardiff, August, 1891.

I.—Discovery of the Olenellus-zone in the North-west Highlands. By Sir Archibald Geikie, F.R.S., Director-General of the Geological Survey.

EVER since the Geological Survey began the detailed investigation of the structure of the North-west Highlands of Scotland the attention of its officers has been continuously given to the detection of any fossil evidence that would more clearly fix the geological horizons of the various sedimentary formations which overlie the Lewisian gneiss. A large collection of organic remains has been made from the Durness Limestone, but it has not yet yielded materials for a satisfactory stratigraphical correlation. The study of this collection, however, has confirmed and extended Salter's original sagacious inference that the fauna of the Durness Limestone shows a marked North American facies, though, according to our present terminology, we place this fauna in the Cambrian rather than in the Silurian system. Below the Durness Limestone lies the dolomitic and calcareous shaly group known as the 'Fucoid beds,' which, though crowded with worm-castings, has hitherto proved singularly devoid of other recognizable organic remains. In following this group southwards through the Dundonnell Forest, in the west of Ross-shire, my colleague, Mr. John Horne, found that, a few feet below where its upper limit is marked by the persistent band of 'Serpulite grit,' it includes a zone of blue or almost black shales, During a recent visit to him on his ground, when he pointed out to me this remarkable zone, I was struck with the singularly unaltered character of these shales, and agreed with him that, if fossils were to be looked for anywhere among those ancient rocks, they should be found here, and that the fossil collector, Mr. Arthur Macconochie, should be directed to search the locality with great care. The following week this exhaustive search was undertaken, and Mr. Macconochie was soon rewarded by the discovery of a number of fragmentary fossils, among which Mr. B. N. Peach, who was also stationed in the district, recognized what appeared to him to be undoubtedly portions of *Olenellus*. The importance of this discovery being obvious, the search was prosecuted vigorously, until the fossiliferous band could not be followed further without quarrying operations, which in that remote and sparsely inhabited region could not be at that time undertaken. The specimens were at once forwarded to me, and were placed in the hands of Messrs. Sharman and Newton, Palæontologists of the Geological Survey, who confirmed the reference to *Olenellus*. More recently Mr. Peach and Mr. Horne, in a renewed examination of the ground, have found, in another thin seam of black shale interleaved in the 'Serpulite grit,' additional pieces of *Olenellus*, including a fine head-shield with eyes complete. There may be more than one species of this Trilobite in these Ross-shire shales. The specific determinations and descriptions will shortly be given by Mr. Peach.

The detection of *Olenellus* among the rocks of the North-west Highlands, and its association with the abundant *Salterella* of the 'Serpulite grit,' afford valuable materials for comparison with the oldest Palæozoic rocks of other regions, particularly of North America. The 'Fucoid beds' and 'Serpulite grit' which intervene between the quartzite below and the Durness Limestone above are now demonstrated to belong to the lowest part of the Cambrian system. The quartzites are shown to form the arenaceous base of that system, while the Durness Limestones may be Middle or Upper Cambrian. On the other hand, the Torridon Sandstone, which Murchison placed in the Cambrian series, can now be proved to be of still higher antiquity. The marked unconformability which intervenes between it and the overlying quartzite points to a long interval having elapsed between the deposition of the two discordant formations. The Torridon Sandstone must therefore be pre-Cambrian. Among the 8,000 or 10,000 feet of strata in this group of sandstones and conglomerates, there occur, especially towards the base and the top, bands of grey and dark shales, so little altered that they may be confidently expected somewhere to yield recognizable fossils. Already my colleagues have detected traces of annelids and some more obscure remains of other organisms in these strata. These, the oldest relics of life yet known, have excited a vivid desire in the Geological Survey to discover further and more determinable fossils associated with them in the same primeval resting-place. We shall spare no pains to bring to light all that can be recovered in the North-west Highlands of a pre-Cambrian fauna.